



National Transportation Safety Board Forum

April 29th, 2008

“Unmanned Aerial Systems”

Perspective of Other NAS Users



Air Transport Association

The Air Transport Association of America is the premier trade group of the principal U.S. airlines. ATA airline members and their affiliates transport more than 90% of U.S. airline passenger and cargo traffic.

ATA Members

*ABX Air, Inc. (GB)
AirTran Airways (FL)
Alaska Airlines, Inc. (AS)
Aloha Airlines, Inc. (AQ)
American Airlines, Inc. (AA)
ASTAR Air Cargo, Inc. (ER)
Atlas Air, Inc. (5Y)
Continental Airlines, Inc. (CO)
Delta Air Lines, Inc. (DL)*

*Federal Express Corporation (FX)
Hawaiian Airlines (HA)
JetBlue Airways Corp. (B6)
Evergreen International Airlines, Inc. (EZ)
Midwest Airlines (YX)
Northwest Airlines, Inc.
United Airlines, Inc. (UA)
UPS Airlines (5X)
US Airways, Inc. (US)*



Early UAVs

Twice a day, every day of the year, weather balloons are released simultaneously from almost 900 locations worldwide! This includes 92 released by the National Weather Service in the US and its territories. The balloon flights last for around 2 hours, can drift as far as 125 miles away, and rise up to over 100,000 ft. (about 20 miles) in the atmosphere!





The First UAVs

“Originally developed for military applications, most unmanned aircraft were built with high-risk applications and environments in mind.

Little, if any, consideration was given to making these aircraft suitable for flights in a mature civil aviation system — one controlled and monitored by sophisticated systems and governed by a rigorous regulatory structure.”

Robert Boetig and Matthew DeGarmo, Mitre Corp.



- RTCA Airspace Workgroup
 - Special Committee 203 documents
 - *“Minimum Performance Standards for Unmanned Aircraft Systems and Unmanned Aircraft”*
 - *“Minimum Aviation System Performance Standards for Sense and Avoid and Command/Control Communications.” - MASPS*



Mitre CAASD (2007)

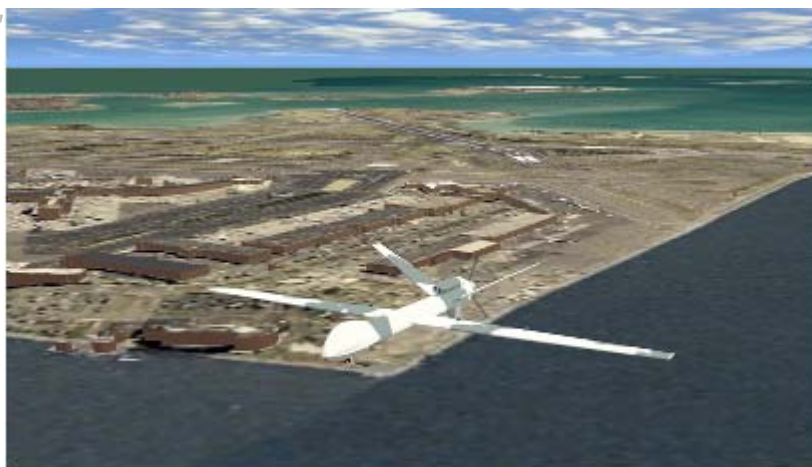
- *Center for Advanced Aviation System Development (CAASD) - Preliminary Findings**
 - *Command/Control frequency spectrum allocation*
 - *Size - visibility, radar cross-section, collision avoidance, down-sized communications & safety electronics*
 - *Mission characteristics – Stationary orbit or dwell*
 - *Helping define performance standards via RTCA*
 - *MITRE and MIT are attempting to determine if there are operational limitations/size restrictions that could be placed on small unmanned aircraft that would enable safe ops with minimal scrutiny.*

**Unmanned Aircraft in Civil Airspace: Challenges and Opportunities - October 5, 2007 – Robert Boetig and Matthew DeGarmo*



FAA's Unmanned Aircraft Project office*

This office...must find methods to support the integration of UAs in the NAS without causing delays, capacity reduction, or placing current NAS users at increased risk.



The UAPO is responsible to develop the necessary guidance and regulations for UA certification and operation to ensure their safe integration into the NAS.

www.faa.gov/about/office_org/headquarters_offices/avs/offices/air/hq/engineering/uapo

Air Transport Association of America, Inc.

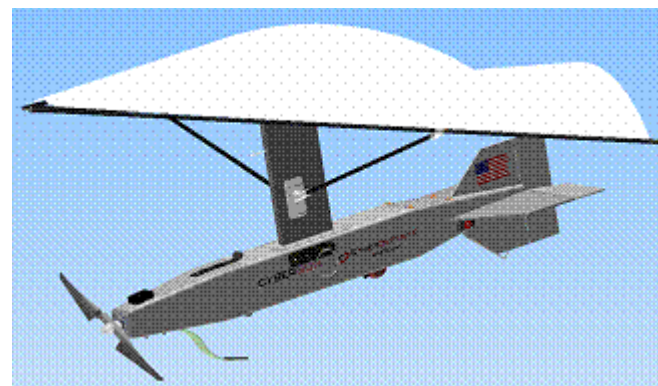


FAA's Unmanned Aircraft Project office*



Operators on the ground control the Shadow 200B. The aircraft is slightly more than 11 feet long, has a wingspan of 14 feet, and weighs about 375 pounds. It has a top speed of 118 knots and achieves a maximum altitude up to 19,000 feet.

The Cyber Defense 'Cyberbug' UAS is believed to be the smallest UAS issued an airworthiness certificate, weighing in at 8.5 lbs. This is the ninth experimental certificate issued to an unmanned aircraft in 2007.



Burlington MIDO issued an experimental certificate to Telford Aviation for their Skybus 30K UAS. This is the first certificate issued to an unmanned airship



FAA's Unmanned Aircraft Project office*

The GE-50 aircraft is a VTOL, ducted fan, that weighs approximately 20 lbs. Aurora was authorized to operate their UAS for the purposes of R & D, crew training and market survey.



On December 6, 2007, the San Antonio MIDO issued an experimental certificate to Honeywell for their gMAV UAS. The gMAV aircraft is a VTOL, ducted fan, that weighs approximately 18 lbs. Honeywell is authorized to operate their UAS for the purposes of R & D, crew training and market survey. Honeywell will operate the gMAV on the property of the Laguna Pueblo, NM.

Phoenix MIDO issued 3 experimental certificates to Raytheon Cobra unmanned aircraft. Two of the aircraft were new duplicates to the first aircraft the Team evaluated in July-September 2006. The third aircraft was a recertification of the first aircraft.





Unmanned Aerial Systems - Surveillance

- *ATA recognizes the ongoing and proposed UAS operation in the NAS by federal agencies:*
 - *DoD operations*
 - *Homeland Security – DHS, USCG, etc.*
 - *Enforcement of U.S. Laws & Treaties – Customs, INS, Border Protection, etc.*
- *FAA certification, DoD training, and coordination with other government agencies are essential to de-conflict UAS employment with civil aircraft operations*



Unmanned Aerial Systems - Federal

- *We have learned only 2 types of UASs operate in Class A airspace above FL180*
 - *Global Hawk*
 - *Predator*
- *These UASs climb/descend in Military Operating Areas clear of civil aircraft*
 - *Unless accompanied by a “chase plane”*
 - *With Instrument Flight Rule capability*
- *Pilots are:*
 - *Designated Aviators - USN*
 - *“Rated” officers – USAF*
 - *Enlisted Technicians – USA and USMC (trained to equivalency of FAA Private Pilot Rating)*



Local/State Law Enforcement Agencies are “unique operators”

- Could use a variety of UAS systems from ultra small to medium-sized platforms.*
- Single point of failure; no systems back-up or redundancy*
- Cannot fly over populated areas*
- Operate in Class D, E & G airspace*
- Ground observer “line of sight” and “clear of clouds”*
- Unlicensed law enforcement officials must have sufficient airspace rule knowledge to operate these vehicles in the vicinity of an airport.*
- Certification of airframe based on characteristics and area of operation*



Major Concerns

- *Launch and recovery near populated areas and airports*
 - *Will they know what altitudes or flight paths they should avoid near an airport (whether large or small)?*
 - *Advisory Rulemaking Committee may propose operating a 4 lb. UAS at or below 400' AGL in a Class B or C airspace!*
- *Compatibility with performance characteristics and requirements of manned commercial aircraft in controlled airspace (at 0.35 Mach)*
 - *RNAV off-airway navigation, RNP*
 - *Radar vectoring by ATC*
 - *Category I, II or III Instrument Landing Systems*
 - *Traffic Collision Avoidance System (TCAS II)*
 - *GPS Nav & Enhanced Ground Proximity Warning Systems*



Major Concerns

- *Can the UAV operator truly fly under Part 91 “see and avoid” rules when operating below FL180, including cloud clearance requirements?*
- *Will the UAV always be “visible” to other aircraft when transiting the NAS?*
 - *With no on-board pilot and no transponder, a mid-air collision is a higher risk.*
 - *The highest risk is a unguided, “dark” UAV that is not giving out transponder/altitude data moving through occupied airspace.*



Major Concerns

- *What about the “synthetic cockpit environment” and human factors?*
 - *Shouldn’t the operator on the ground have the “look and feel” of a cockpit in an airborne manned aircraft, particularly when operating in or near high density traffic areas?*
 - *For a future ultra-large payload UAS, something on the order of a full motion visual simulator?*
 - *At the very least for tactical UASs, a synthetic vision or virtual reality system that keeps the operator fully engaged in flight situation awareness as well as mission situation awareness*